**Before the**
**Federal Communications Commission**
**Washington, D.C. 20554**



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| In the Matter of | ) | |
| | ) | |
| The Development of Operational, | ) | |
| Technical and Spectrum Requirements | ) | |
| For Meeting Federal, State and Local | ) | WT Docket No. 96-86 |
| Public Safety Agency Communication | ) | |
| Requirements Through the Year 2010 | ) | |
| | ) | |
| Establishment of Rules and Requirements | ) | |
| For Priority Access Service | ) | |

# PETITION FOR RECONSIDERATION

**TELECOMMUNICATIONS INDUSTRY ASSOCIATION**
**Wireless Communications Division**

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## SUMMARY

TIA is an American National Standards Institute ("ANSI") accredited standards developer. As such, it has a long track record in developing standards for private radio equipment, including public safety equipment. TIA is familiar with ANSI procedures and processes. It supports the Commission's goal of use of such ANSI-approved processes to generate standards for public safety equipment, but on reconsideration requests that the FCC's Order be amended to recognize the use of existing ANSI accredited Standards Development Organizations ("ASDOs"). This will support the FCC's goals, but will also save time in bringing the needed standards to this segment of the industry. If the National Coordination Committee were to seek its own accreditation, significant delays in creating needed standards would occur. TIA has served and stands ready to serve the need for ANSI standards for public safety equipment.

TIA also requests that the Order be amended to clarify that ANSI itself is not a standards developer and that ANSI cannot determine fair and reasonable licensing terms for intellectual property, but that ANSI's patent policy is a good reference point. Such actions would also follow the Congressional guidance set forth in the National Technology Transfer and Advancement Act.

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**PETITION FOR RECONSIDERATION**

Pursuant to Commission rules, section 1.429, 47 C.F.R. §1.429, the Telecommunications Industry Association's Wireless Communications Division ("TIA") hereby files this Petition for Reconsideration. As an American National Standards Institute ("ANSI")-accredited Standards Development Organization ("SDO") TIA appreciates the Federal Communications Commission's ("FCC" or the "Commission") recognition in the Commission's First Report and Order (the "Order")[1] of the value of ANSI-accreditation and ANSI's requirements of openness, consensus and due process in connection with the voluntary standards development process. TIA is submitting this Petition for Reconsideration because TIA has a recommendation regarding the Commission's stated intent to have the National Coordination Committee ("NCC") seek ANSI accreditation. In addition, TIA respectfully requests that the Commission modify

[1] *See* the First Report and Order and Third Notice of Proposed Rulemaking, FCC 98-191, released September 29, 1998, 63 Fed. Reg. 58645 (November 2, 1988).

the Order to eliminate ANSI's proposed role in approving license fees (and related terms and conditions) as contemplated in paragraph 122 of the Order.[2]

## Description of ANSI

TIA is accredited by ANSI as an SDO. In addition, TIA's Vice President of Standards and Technology holds a seat on ANSI's Board of Directors and chairs its Patent Committee. TIA, its members, and TIA staff are very much involved in ANSI activities.

By way of background, ANSI is a private sector organization that serves many roles:

- ANSI is a federation of companies and organizations that establishes a national consensus on national and international standards and conformity assessment policy as it relates to trade, regulatory matters, and the integrity of the processes.
- ANSI's mission is to enhance both the global competitiveness of U.S. business and U.S. quality of life by promoting and facilitating voluntary consensus standards and conformity assessment systems and safeguarding their integrity.
- The ANSI membership, representing all interested parties, includes nearly 1,600 organizations from the business community, professional and engineering societies, trade associations, federal, state and local government agencies, consumer interests, labor, academia, laboratory and testing organizations and others.
- ANSI approves "American National Standards" and ensures that its guiding principles – consensus, due process, balance and openness – are followed by accrediting and auditing nearly 200 standards developing organizations.
- ANSI represents the U.S. at the International Organization for Standardization ("ISO"), the International Electrotechnical Commission ("IEC") via the Institute's U.S. National Committee to the IEC, the International Accreditation Forum ("IAF"), and several regional standards and conformity assessment organizations. ANSI has

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[2] As a member of ANSI and because TIA staff holds an ANSI Board seat and chairs the ANSI Patent Committee, this pleading was coordinated with ANSI and contains many similar points and arguments.

also participated in the State Department's ("DoS") International Telecommunications Advisory Committee ("ITAC") which is a Federal Advisory Committee on policy matters at the International Telecommunication Union ("ITU") and representatives from DoS and other federal agencies participate on the Institute's Board level, International Committee. ANSI for example, was active with DoS on the issue of the European Telecommunications Standardization Institute's ("ETSI") Intellectual Property Rights ("IPR") debate, and has addressed other IPR issues that come before ITAC.

- In addition to accrediting domestic standards developers, ANSI also accredits U.S. Technical Advisory Groups ("TAGs") to ISO, and conformity assessment programs.

- ANSI also accredits and audits product certifiers and, in a joint venture with the Registrar Accreditation Board, ISO 9000 and 14000 registrars.

- In support of its mission, ANSI provides information and training services related to national and international standards and conformity assessment activities.

Additional information about the Institute can be found on ANSI Online at www.ansi.org.

## Description of ANSI's standards developer accreditation and standards approval programs

ANSI accreditation of a standards developer such as TIA signifies that the developer's procedures for the development of standards meet all of ANSI's requirements. These requirements are based on due process principles of openness and fairness. The developer must have an adequate appeals process. In addition, each accredited standards developer must have a group of individuals who serve as the consensus body or formulating group. The consensus body must represent a balance of relevant interest groups. When that body has reached a consensus on a standard intended to be an American National Standard, the Standards Proposal ("SP") is ready for public review and ultimately approval by ANSI. ANSI's requirements are delineated in the *ANSI Procedures for the Development and Coordination of American National Standards* (the "ANSI Procedures"), which are available on the ANSI web site. As an

organizationally-accredited SDO, TIA's procedures have been found to comply with ANSI Procedures and TIA's procedures, its Engineering Manual, can be found on the TIA web site at www.tiaonline.org.

The ANSI Executive Standards Council ("ExSC") is responsible for all matters relating to the accreditation of standards developers. It hears appeals regarding accreditation matters. The ExSC also is responsible for maintaining and when necessary recommending revisions of the ANSI Procedures to the appropriate ANSI Board Committee, and other related procedures. The ExSC is made up of experienced standards volunteers from companies, government, consumer organizations, and standards developers. When the ANSI Procedures are changed, SDOs are informed and given a period of time to revise their procedures to comply.

Currently, ANSI accredits standards developers under one or more of the following three "methods":

> *Accredited Organization:* If an organization has its own unique procedures that meet the requirements set forth in the ANSI Procedures and wants its own accreditation, then it may want to become an accredited organization. The organization has its own procedures (that are ANSI-approved) that apply to any and all of its "consensus bodies." A consensus body is usually a committee of individuals that is balanced (*i.e.*, has representatives from all of the relevant interest groups) and its goal is to achieve consensus on a standard. The organization usually provides administrative support as the Secretariat for the consensus body or bodies. TIA is accredited under this method of accreditation.
>
> *Accredited Committee:* An accredited committee is a committee (consensus body) that usually is administratively supported by a separate Secretariat organization. An accredited committee can prepare its own procedures that meet ANSI requirements, or it can use Annex A of the ANSI Procedures which is a model set of procedures for an accredited committee. Because an accredited committee may be viewed legally as an unincorporated association, ANSI recommends that accredited committees specify the roles and responsibilities of the committee vis-a-vis the Secretariat. An example of an

Accredited Standards Committee in the field of telecommunications would be Committee T1 which is sponsored by its Secretariat, the Alliance for Telecommunications Industry Solutions ("ATIS").

*Canvass Method:* All accredited canvass developers must use the procedures set forth in Annex B of the ANSI Procedures. Basically, under the canvass method, the consensus body is a list of "canvassees." The list must reflect a balance of relevant interests. When a proposed standard is ready, it is balloted to the members of the canvass list. An example of a canvass method accredited developer related to telecommunications field might be Underwriters Laboratories ("UL").

All accredited standards development organizations ("ASDOs") are required to be audited by ANSI once every five years. This is a procedural audit to (i) determine whether the developer is following its procedures and ANSI requirements and (ii) suggest to the ASDO ways in which the ASDO can improve its standards development processes. If the ASDO is newly accredited, its first audit will take place after it has completed the processing of its first American National Standard. TIA recently completed an audit in 1998.

Questions related to an ASDO's accreditation can have complaints filed with and heard by the ExSC, with further appeals to the ANSI Appeals Board. ANSI currently has approximately 180 ASDOs.

In Section 273 of the Telecommunications Act of 1996, Congress noted the benefits of accreditation programs such as ANSI's and even required the FCC to administer a program for non-accredited standards developing organization ("NASDOs") which encompasses many of the notice, opportunity for comment, appeals, and other due process portions of the ANSI process for certain industry wide standards used in procurement.

The ANSI and TIA standards development and approval processes generally takes from 6 months to 2 years and can be summarized as follows:

Step 1 is the PINS notification. PINS stands for "Project Initiation Notification System." ANSI requires that ASDOs submit a PINS form that basically states that the ASDO is beginning to develop a standard in a certain area. The PINS form is also used to announce revision or withdrawal of an American National Standard. ANSI announces that in ANSI *Standards Action.* TIA posts PINS information on its web page, and also gives notice via TIA's *Industry Pulse*, in that publication's Standards Action section. A sample of *Industry Pulse* Standards Action is attached as Exhibit A, noting recent TIA ANSI standards for public safety digital radio systems . In part, the PINS system enables standards developers to coordinate similar and potentially overlapping standards development activities as well as providing public notice to materially interested parties of a new work item.

Step 2 is the process by which the formulating group develops consensus on a document. Consensus does not mean unanimity. The formulating group must review and address any negative votes or comments from members of the consensus body. If a member of the consensus body or other materially interested party believes that it was treated unfairly and that the relevant procedures were not followed, it can file an appeal with the ASDO and in some cases further appeals to ANSI. In most cases, appeals are resolved quickly by action of the Secretariat. In some cases, a disinterested Appeals Panel may need to be formed. In the last 10 years, TIA only had one case where it needed to convene an Appeals Panel.

Step 3 is the public review announcement. When the consensus body believes that it has a satisfactory draft or a proposal for an American National Standard, it submits a Board of Standards Review ("BSR") form known as a BSR-8 Form to ANSI. ANSI then places a 60-day public review notice in *Standards Action* seeking any further comments from the public at large. In TIA's process, these public review comments are treated the same as comments from members of the formulating group. If a public review commentator believes that it was treated unfairly and that the relevant procedures were not followed, it can file an appeal with the ASDO and in some cases further appeals with ANSI.

If the TIA formulating group decides to revise the proposed American National Standard as a result of a public review comment and if any substantive changes are made to the standard as a result of reviewing the comments, the proposed standard must undergo another public review.

Step 4 is the submission of the standard to ANSI for final approval as an American National Standard. When the standard is ready to be submitted for final approval, then the ASDO submits a BSR-9 Form to ANSI. If any essential patents have been made known to the standards developer, then statement(s) of willingness to license such essential intellectual property on terms that are fair,

reasonable and non-discriminatory and otherwise in accordance with ANSI's Patent Policy must also be filed with ANSI.

The ANSI Board of Standards Review is the committee that is responsible for approving American National Standards. The BSR is made up of experienced standards volunteers from companies, government, consumer organizations, and standards developers. If any member of the BSR has a conflict with the document under review, they would recuse themselves from a decisional role. TIA has an internal group, a specialized subcommittee of the TIA Technical Committee, known as the Technical Standards Subcommittee ("TSSC") that also conducts a procedural review of the entire file on a proposed TIA standard. This is a similar review to that conducted by BSR. Thus, there are multiple protections of the due process system.

If the BSR takes an action on a standard, any materially affected party who believes that the appropriate ASDO or ANSI procedures were not followed can submit an appeal to the BSR. This does not happen very often. Typically such a person would be an unresolved consensus body member or unresolved public review commentator. A decision of the BSR can be further appealed to the ANSI Appeals Board.

Similarly, Section A5 of the TIA Engineering Manual provides a process by which formal complaints can be filed with TIA as part of its complaint/appeals process.

## The Commission's Order as it relates to TIA and ANSI

First TIA will address the Order as it relates to the accreditation of the NCC. Second we will address the proposed role for ANSI in connection with the licensing terms and conditions relating to any proprietary data incorporated into technical standards relating to public safety interoperability channel equipment.

## The proposed NCC accreditation

TIA notes that in paragraphs 7, 10, 92, 105, 113, 117, 122 and 219, the Order specifies that either the NCC or a working group established thereunder will seek ANSI accreditation as a standards developer in order to develop and/or recommend certain voluntary technical standards to the Commission. TIA believes that the Order mistakenly refers to ANSI accreditation as ANSI "certification" of a standards developing body. ANSI's role is strictly that of an accreditor. The term "certification" is a standards or conformity assessment term typically reserved for the processes of those organizations that conduct tests and certify that certain products, management systems, or services conform to certain standards. The Commission similarly has precisely defined terms used with its Part 2 Equipment Authorization Procedures, and "certification" has a precise definition in that context also. *See* §2.907.

Certainly the NCC or a related working group could seek ANSI accreditation but that is not necessary in this instance. There is already an ASDO which has provided and can provide American National Standards for the type of equipment contemplated in the Order.

TIA has an Engineering Committee, currently known as TR-8, Mobile and Personal Private Radio Standards, which has been actively involved in generating standards for this type of private radio equipment for over fifty years. TR-8 was featured in TIA's first Standards and Technology Annual Report ("STAR") in 1994, as TIA celebrated 50 years of active standards writing for the industry. Exhibit B is a copy of that 1994 STAR article. In addition, Exhibit C is a copy of the TR-8 sections of STAR for 1994, 1995, 1996, and 1997, highlighting the standards work of TR-8. The standards produced by TR-8 include voice and data applications, and system and service definitions, interoperability, compatibility, and compliance requirements for systems and services. Private radio systems include those used for public safety radio applications as discussed in the Order. TR-8 has done technical work on Enhanced Digital Access Communications Systems ("EDACS") and produced a suite of documents for Project 25. This effort was coordinated between the TIA Ad Hoc Project 25 Interface Committee ("APIC") and TR-8. Exhibit D is a list of documents generated by TR-8 including several American National Standards for public safety equipment.

If the NCC or a working group of it were to seek ANSI accreditation, then that organization would submit an application for accreditation, the application would be reviewed by a subcommittee of the ExSC (aptly named the Accreditation Subcommittee). The ExSC also reviews it. The ExSC also places a public review notice regarding the proposed accreditation in ANSI's *Standards Action,* and solicits comments from the public.

TIA has observed that it can take up to 15 months for ANSI to approve an application for accreditation. The process is usually quicker if the applicant proposes to

use one of the sets of model procedures (Annex A or Annex B of ANSI Procedures). Typically if there is a time lag in connection with an accreditation, it is because (a) the organization had little experience in connection with the administrative and procedural aspects of the standards development process, (b) the accreditation application generated opposition as a result of public review, or (c) the procedures are either very complicated or unacceptable. If the proposed scope of an applicant overlaps that of current ASDOs such as TIA or there are serious questions of competency to develop standards in a proposed technical area, it is very likely that oppositions will be filed on these and related issues. In one recent case related to telecommunications, the applicant narrowed its scope to areas of known competency and agreed to work cooperatively with other ASDOs on joint standards in remaining areas of potential overlap. Prolonged resolution of such issues can dramatically increase the time interval for accreditation.

If substantive changes are made to the proposed procedures as a result of the accreditation review process, the procedures may have to be subjected to additional public review periods.

To summarize, if the NCC or a working group of it decided to seek ANSI accreditation, it would have to (a) identify a Secretariat who would be responsible for the administrative aspects of the standards development process, (b) prepare or identify the procedures it would use to develop standards and (c) undergo the accreditation approval process and submit to subsequent procedural audits. The process to discuss, prepare and draft a set of proposed procedures before filing with ANSI itself may take several months or even a year or two. Most ASDOs spend a significant amount of time in their initial preparation of procedures for a new organization. TIA initially processed standards under

the Electronic Industries Alliance (formerly Electronic Industries Association or "EIA") accreditation before becoming separately ANSI-accredited. TIA spent over a year developing the procedures it filed for accreditation.

TIA notes that in the Order, the Commission is requiring that the NCC complete its work in the next four years. The procedures preparation interval and accreditation interval could significantly use up a major portion of this four-year interval leaving no or limited time for the actual technical standards work. Consequently, on reconsideration, TIA strongly recommends that the Commission modify the language in its Order to specify that the NCC or a related Working Group become ANSI-accredited, or that the NCC rely on an already-accredited ANSI standards developer who has expertise in this area of telecommunications work. (Emphasis added) TIA has developed, approved and published American National Standards for this type of equipment already in its Engineering Committee TR-8.

The advantages of using an already-accredited standards developer are (a) TIA has already done standards work in the area contemplated by the Order, (b) accredited standards developers have already undergone the accreditation process (including audits of that process) and they can begin any required standards development work immediately, and (c) they have experience in administering the development process and providing the necessary documentation to ANSI. In addition, they can take responsibility for maintaining the standard. (ANSI requires that all American National Standards must be revised, reaffirmed or withdrawn after five years.)

**The proposed role for ANSI relating to intellectual property licensing is not appropriate or necessary**

Having clarified ANSI's role and procedures regarding American National Standards and accreditation of standards developers and TIA's willingness to produce the American National Standards contemplated in the Order, TIA will now discuss the portion of the Order where the Commission has directed an expanded, unwanted role for ANSI. In paragraph 122 of the Order, it states that:

> [T]echnical standards for all interoperability channels in the 700 MHz band should be chosen and recommended in accordance with the following process, reporting requirements and time frame:
>
> . . . no proprietary data is to be incorporated in any standard ultimately recommended unless the proprietary data is made available on a fair, reasonable, unbiased and non-discriminatory basis, with license fees approved by ANSI and on terms and conditions set by that standards body . . . ."

TIA submits that ANSI is incapable of determining what are fair, reasonable, and non-discriminatory license fees in connection with any proprietary data incorporated into standards. There is no one on ANSI staff who has the expertise to do this, nor is it something that the voluntary standards community or intellectual property holders would want ANSI to undertake, nor is it a role that ANSI sought from the Commission. In many cases TIA members are the companies who have invested millions of dollars in Research and Development and produced new technology and patented inventions that may be used in standards if the formulating group believes there is a technical reason to justify that use.

ANSI's and TIA's patent policy in connection with American National Standards (which is very similar to the patent policies followed by ISO and IEC, the two largest non-treaty international standards organizations) provides that a standard may include

patented technology if there are technical reasons to justify that approach. Any identified patent holder, however, must provide to TIA who in turn forwards to ANSI a statement that the patent holder either will (a) make its technology available to those desiring to implement the standard without compensation to the patent holder or (b) license its technology under reasonable and non-discriminatory terms and conditions.

The purpose of this policy is to balance the rights of patent holders to exploit their government-granted monopoly with the rights of users of the standard. In other words, while the patent holder may enjoy the market power it receives from its patented technology, the patent holder should not be able to obtain any unfair market power as a result of the incorporation of that technology into a consensus standard. As ANSI advised the Federal Trade Commission in its hearing on FTC vs. Dell Consent Decree, the ANSI Patent Policy is "pro-competitive" in that patent holders are required to license to all parties, including their competitors, on reasonable, non-discriminatory terms under such policies.

By filing a statement with TIA and ANSI, a patent holder represents to the community of standards users that it will license on reasonable and non-discriminatory terms and conditions. TIA and ANSI keep these statements on file, but do not review any licensing terms and conditions. Beneficiaries of this statement made to ASDOs and ANSI can seek other methods of enforcing the statements.

To date TIA believes that the ANSI/TIA patent policy, which is largely self-policing and also very similar to the policy followed at the International Telecommunication Union ("ITU"), has been effective and resulted in acceptable

licensing terms and conditions. The risks if a company makes such a representation and fails to adhere to it are that (1) the approval of the standard is subject to withdrawal or not being published in the first instance, often rendering the company's innovation relatively useless; (2) competitors can avail themselves of their legal rights in court; and (3) in the case of deliberate misconduct, the FTC can intervene. In addition, a company engaging in such conduct likely would lose some of its stature in the standards development community.

**ANSI is not an SDO but accredits SDOs**

Additionally, in paragraph 122, the Commission refers to ANSI as a "standards body" which might mislead some readers to think that ANSI is a standards developer, which it is not. ANSI accredits standards developers but is not a standards developer itself.

On reconsideration, TIA recommends that this paragraph be modified to read as follows, which TIA believes preserves the intent of what the Commission sought:

> [T]echnical standards for all interoperability channels in the 700 MHz band should be chosen and recommended in accordance with the following process, reporting requirements and time frame:
>
> . . . no intellectual property is to be incorporated in any standard ultimately recommended unless the intellectual property is made available on a fair, reasonable, non-discriminatory basis, as required by the Patent Policy of ANSI . . . ."

This approach would also be in keeping with the guidance given federal agencies under the National Technology Transfer and Advancement Act ("NTTAA") and Office of Management and Budget ("OMB") Circular A-119, 63 Fed. Reg. 8545 (February 18, 1998), Sections 4a and 6j, which recommend that federal agencies participate in and

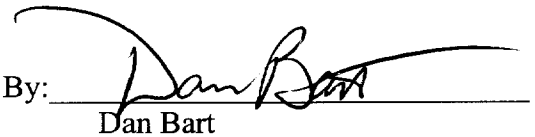
support the voluntary standards process and that patents essential to a standard be licensed on terms that are reasonable and non-discriminatory.

## CONCLUSION

On reconsideration, TIA requests that the Commission specifically refer to allowing existing ASDOs to be utilized by the NCC and that the Order's language referencing licensing of intellectual property be modified as requested herein.

Respectfully submitted,

**TELECOMMUNICATIONS INDUSTRY ASSOCIATION**
**Wireless Communications Division**

By: 
Dan Bart
Vice President, Standards and Technology

Jesse Russell, Chair, Wireless Communications Division

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December 2, 1998 703-907-7703

# Standards Action

*Please note that project numbers for all TR committees may be found in the Communications Standards Summary (CSS). CSS provides a complete listing of TIA TR committee PN- and SP- projects and their status four times a year. For more information, contact Communications Standards Review at (650) 856-9018 or by fax at (650) 856-6591.*

**A Telecommunications Systems Bulletin is not a TIA Standard, but rather, contains technical material which may have value to the industry and users.*

## New Project Numbers

■ **Project Number 4246** - *Return Loss of a Polarization Maintaining or Polarizing Fiber Coupled Device* Polarization maintaining (PM) fiber and single polarization fiber (PZ) are being used in fiber optic sensors and high-end telecommunication components. With regard to return loss, FOTP-34 only addresses standard single-mode and multimode fiber applications. The unique characteristics of PM/PZ fiber and specialized launch requirements dictate that a separate FOTP describing the proper method for measuring return loss be developed in support of this unique fiber technology. If interested, contact Dennis Horwitz, RIFCOS Corporation, 833 Flynn Road, Camarillo, CA 93012, or call (805) 389-9868, Ext. 101.

■ **Project Number 4247** - *Personal Wireless Telecommunications (PWT) Service Profile A&B, Class 2* This document defines a frame relay service for mobile devices supporting PWT. If interested, contact William Cruz, Lucent Technologies, 101 Crawfords Corner Road, Holdel, NJ 07733, or call (732) 817-2777.

■ **Project Number 4248** - *Measuring Strip Force for Mechanically Removing Coating from Fiber Optic Ribbon* This document defines the procedure to evaluate ribbon stripability. This test provides a uniform method for evaluating peak strip force and for evaluating the results of the stripped ribbon samples. If interested, contact Eric Urruti, Corning, SP-DV-01, Corning, NY 14831, or call (607) 974-3859.

■ **Project Number 4252** - *Polarization Maintaining Fiber in Telecommunications: Applications and Issues* This document provides background and application guidelines for the special requirements and uses of polarization-maintaining fiber in the telecommunications industry. If interested, contact Rex Craig, NIST, 325 Broadway/MS.815.03, Boulder, CO 80303, or call (303) 497-3359.

■ **Project Number 4253** - *Coating Geometry Measurement for Optical Fiber* Several FOTPs currently exist for the measurement of coating geometry. This document will consolidate the various methods under a single standard. If interested, contact Anne Marie Auchu, Corning, 35 W. Market Street, Corning, NY 14831, or call (607) 974-7307.

■ **Project Number 4254** - *Telephone Network Transmission Model for Evaluating ADSL Systems* This document defines the network model, test equipment, setup and parameter values to be used in the evaluation and comparison of asymmetric digital subscriber line (ADSL) systems. This work will encompass both full rate and "lite" ADSL systems. If interested, contact Jack Douglass, Oak Technology, 139 Kifer Court, Sunnyvale, CA 94086, or call (408) 523-6710.

■ **Project Number 4255** - *Test Procedures for Evaluating ADSL System Performance* This document defines test procedures for evaluating ADSL Systems. This work will encompass both full rate and "lite" ADSL Systems. If interested, contact Jack Douglass, Oak Technology, 139 Kifer Court, Sunnyvale, CA 94086, or call (408) 523-6710.

■ **Project Number 4256** - *Interface Between Data Circuit-Terminating Equipment (DCE) and the Public Switched Telephone Network* This document is a revision of ANSI/TIA/EIA-496A. This work is necessary because the document deviates from the new FCC 47CFR Part 68 and the section on modem tests needs to be removed. If interested, contact Jack Douglass, Oak Technology, 139 Kifer Court, Sunnyvale, CA 94086, or call (408) 523-6710.

■ **Project Number 4276** - *Wireline Replacement Systems Requirements Document* This document addresses system requirements for telecommunications services associated with wireline/wireless services, including basic telephony (sometimes known as POTS) and advanced telecommunications services such as integrated services digital network (ISDN) and packet services. This document recognizes the expanding capabilities of both wire and wireless for services beyond basic voice. This document does not address specific air interfaces nor spectrum allocation associated with wireless networks. If interested, contact Phil Audino, BellCore, 9 Nutfield Drive, Londonderry, NH 03053, or call (603) 434-7575.

■ **Project Number 4277** - *MCS-BS Interface for Public Wireless Communications Systems* This project will upgrade TIA/EIA/IS-634A to become an American National Standard. This document provides the specification for the MSC-BS Interface which coincides with the Reference Point "A" defined in the TR-45 Network Reference Model. If interested, contact Stephen Jones, NEC America, Inc., 600 Sellmeyer Lane, Highland Village, TX 75067-7223, or call (972) 318-0564.

## Standards Proposals

■ **Standards Proposal - 3490-A (TIA/EIA-570-A)** - *Residential Telecommunications*

*continued on page 22*

*Cabling Standard* The purpose of this document is to standardize requirements for residential telecommunications cabling. These requirements are based on required facilities for existing and emerging telecommunications services.

■ **Standards Proposal - 3614-A (TIA/EIA-696)** *Personal Wireless Telecommunications - Enhanced Interoperability Standard* This standard is an application with expanded capability of the PWT standard [1]-[13] in the frequency bands 1850-1910 MHz and 1930-1990 MHz.

■ **Standards Proposal - 3837-A (TIA/EIA-568-A)** *Addendum #3 to TIA/EIA-568-A* This addendum is to revise sub-clauses 3.1 and 13.1 of ANSI/TIA/EIA-568-A.

■ **Standards Proposal 4127 (TIA/EIA-667-A)** *Personal Access Communications System - Wireless User Premises Equipment (PACS-WUPE) Air Interface Standard* This document provides specifications for equipment built to conform to the Spectrum Etiquette required by the FCC rules and the independent PCS systems to share the unlicensed band.

■ **Standards Proposal 3459 (TIA/EIA-3700)** *Telephone Network Transmission Model for Evaluating Analog Modem Performance* This standard defines a model of the characteristics of the public switched telephone network (PSTN) in the continental United States to be used to measure modem transmission performance.

■ **Standards Proposal 3724 (TIA/EIA-579)** *Telecommunications Telephone Terminal Equipment Transmission Requirements for Digital Wireline Telephones* This standard specifies requirements for acoustic-to-digital and digital-to-acoustic transmission performance of digital terminals, including integrated services digital network (ISDN) terminals and terminals connected to the integrated services compatible station (ICS) interface of an integrated services PBX (SPBX).

■ **Standards Proposal 3555 (TIA/EIA-598-B)** *Optical Fiber Cable Color Coding* This standard defines the recommended identification scheme for individual fibers, fiber units or groups of fiber units within a cable structure.

■ **Standards Proposal 3457 (TIA/EIA-604-5)** *FOCIS 5, Fiber Optic Connector Intermateability Standard* This standard is for connectors with the commercial designation of MPO, and is used as an addendum to TIA/EIA/604.

■ **Standards Proposal 3455-A (TIA/EIA-455-123)** *FOTP 123 - Measurement of Optical Fiber Ribbon Dimensions* This standard is a test procedure that provides for measurement of ribbon dimensional parameters. Some or all of these parameters may be important to users of optical fiber ribbon depending on the application.

■ **Standards Proposal 4196 (TIA/EIA-688-A)** *High Frequency Radio Facsimile* This standard defines the image format, line format, synchronization method and modulation method suitable for the transmission of images over noisy, low-bandwidth audio channels, especially HF radio links.

■ **Standards Proposal 4133 (TIA/EIA-604-10)** *Fiber Optic Intermateability Standard* This standard presents the intermateability for simplex and duplex connectors with the commercial designation LC, and is issued as an addendum to TIA/EIA-604.

■ **Standards Proposal 4027 (TIA/EIA-136)** *TDMA Cellular PCS* This standard, when taken in total, defines the requirements for a PCS/Cellular System and mobile station using time division multiple access (TDMA) technology while also maintaining compatibility with AMPS analog technology.

■ **Standards Proposal 3968 (TIA/EIA-604-7** *FOCIS 7 - Fiber Optic Connector Intermateability Standard* This standard describes the intermateability standard for connectors designated Type SG, and is issued as an addendum to TIA/EIA-604.

## New Documents Available

■ **ANSI/TIA/EIA-102BAAA** *Project 25 FDMA Common Air Interface New Technology Standards Project Digital Radio Technical Standards* The objective of this document is to define the common air interface for all reference configurations described in the general system model.

■ **ANSI/TIA/EIA-102.BABA** *Project 25 Vocoder Description* This document specified the voice coding method for the Project 25 System and Standard Definition IS102 (originally published as a TSB). It describes the functional requirements for the transmission and reception of voice information using digital communication media described in the standard. This document is specifically intended to define the conversion of voice from an analog representation.

■ **ANSI/TIA/EIA-492CAAA** *Detail Specification for Class IVa Dispersion-Unshifted Single-Mode Optical Fibers* This specification enables end-users and manufacturers of fiber-optic cable to specify the choice of single-mode optical fiber contained in the cable.

■ **ANSI/TIA/EIA-504-A** *Telephone Terminal Equipment - Magnetic Field and Acoustic Gain Requirements for Handset Telephones Intended for Use by the Hard of Hearing* This standard defines magnetic field requirements for all handset telephones intended to couple magnetically with hearing aids. This standard also covers requirements for receive-amplified handset telephones intended for use by the hard of hearing. This standard does not cover

*continued on page 23*

## Standards Action *continued from page 22*

other devices for the hard of hearing to use the telephone network. (Note: this standard replaces EIA/TIA-504 and TIA/EIA-504-1).

■ **TIA/EIA/TSB-29-B-2** *Addendum #2 to Revision B of International Implementation of Wireless Telecommunication Systems Compliant with TIA/EIA-41* This document is issued for the purpose of expediting changes to the contents of the document. All changes are inclusive of the previous Addendum #1.

■ **TIA/EIA/TSB-31-B** *Part 68 Rationale and Measurement Guidelines* This document covers test procedures, test equipment and guidelines for determining compliance with the technical requirements of Part 68 FCC Rules and Regulations. Part 68 was modified in 1997 and the document explains modified test procedures for evaluating materials used for connectors (plugs and jacks) as specified.

■ **TIA/EIA/TSB-54-A** *DTE/DCE Interface Selection Guide* This document has been prepared to assist in the choice of the proper interface standard for use between Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE). The bulletin provides two tables which show the available TIA interface standards.

■ **TIA/EIA/TSB-89** *Application Guidelines for TIA/EIA-485-A* This document provides guidelines for applying circuits complying with TIA/EIA-485-A to form a balanced multi-point data bus. The vesatility of the 485-A electrical standard covers a wide variety of data interchange applications that cannot all be covered in this application. The intent is to provide basic design guidelines of the physical layer.

■ **TIA/EIA/TSB-91** *Satellite ATM Networks: Architectures and Guidelines* This document provides architectures and guidelines for satellite ATM networks. An important element of satellite ATM networking will involve support for the routing, rerouting and handover of active connections.

■ **TIA/EIA/IS-683-A** *Over-the-Air Service Provisioning of Mobile Stations in Spread Spectrum Systems* This document describes over-the-air service provisioning in CDMA and analog systems. The procedures defined are intended to be extendable and flexible enough to be used with future air interface specifications. The procedures in this document do not require support for continuation of the service provisioning process following a CDMA-to-analog handoff.

■ **TIA/EIA/IS-727** *TDMA Cellular/PCS - Radio Interface - Minimum Performance Standards for Discontinuous Transmission Operation of Mobile Stations* This document specifies the procedures to be employed to verify that implementations of VAD processing in conjunction with the IS-641 DTX/CNG feature meet strict minimum performance requirements.

■ **TIA/EIA/IS-764** *TIA/EIA-41-D Enhancements for Wireless Calling Name Feature Descriptions* This document describes CNAP and CNAR features, and specifies the operation of CNAP and CNAR so that a roaming wireless subscriber can use these features in a seamless manner.

## CTIA Proposes Requirements for Emergency Calls

*continued from page 12*

that all 9-1-1 calls automatically go to the strongest control channel signal available. The CTIA submission explains that the alliance's proposal could actually cripple emergency response. CTIA's input provides technical support for the position taken by the public safety community in opposition to the alliance's proposal.

The technical analysis by CTIA explains: "When a 9-1-1 call needs to be made, the call origination should not use radiofrequency (RF) signal strength as the sole guide. In fact, the analysis... shows that this policy improves the call origination success rate only slightly under light call traffic conditions. When the call traffic is beyond a moderate level, this policy is more likely to hurt the call origination success rate than improve it. When the call traffic is heavy or when many 9-1-1 calls need to be made due to the large scale of an emergency incident, this policy may even lead to catastrophe with an unacceptably high level of blocking rate."

*For more information, contact Vice President of Wireless Communications Eric Schimmel at at (703) 907-7707 or email* eschimme@tia.eia.org. ■

**EXHIBIT**

# FIFTY YEARS OF WRITING STANDARDS

**1944** *President Franklin Delano Roosevelt presented a $99.7 billion war budget to Congress; U.S. planes bombed Berlin for the first time; Allied Forces landed June 6 on the beaches at Normandy; in Syria, the unveiling of women caused an Arab riot; Pensive was first in the Kentucky Derby; Army beat Navy for the first time in five years, 23-7; "Going My Way" took best picture at the Academy Awards; the Dumbarton Oaks Proposals provided the basic plan for the creation of the United Nations; the Youth League of the African National Congress was formed by Nelson Mandela; Elizabeth Taylor appeared in "National Velvet;" Anne Frank, a German diarist, was taken prisoner; a future Vice President of Technical & Regulatory Affairs for TIA was born; and on November 29, 1944, eight men met at the Hotel Biltmore in New York City.*

What caused E.T. Budelman of Link Radio Corporation; H.B. Fischer of Bell Telephone Labs, Inc.; G.G. Gerlach of RCA Victor Division of Radio Corporation of America; D.W. Martin of Bendix Radio Division; C.C. Pond of Philco Corporation; F.M. Rives of the Transmitter Engineering Division of the Electronics Department of General Electric Company; H.L. Shortt of Airadio, Inc.; and D.E. Noble of Motorola to meet on that day at 10:20 a.m.?

*The original Chair of Committee TR-8, engineering pioneer Dr. Daniel E. Noble (left), is shown in 1941 with the industry's first commercially available FM mobile transmitter. Pictured with Noble is fellow Motorola engineer Norm Wunderlich. Above photograph and research courtesy of the Motorola Museum of Electronics.*

The momentous occasion was the first meeting of TR-8, the Committee on Emergency Service, Transmitter Division, of the Radio Manufacturers Association (RMA) Engineering Department.

The RMA would in time change its name to the Electronic Industries Association (EIA). RMA had been formed twenty years earlier in 1924. The Committee on Emergency Service, Transmitter Division, would in 1951 change its name to TR-8, Land Mobile Services. Fifty years after the first meeting of that TR-8 Engineering Committee, it is still in existence and known as the Mobile and Personal Private Radio Standards Committee.

In 1988, the Information and Telecommunications Technology Group (ITG) of EIA, along with all the Engineering Committees sponsored by ITG, were spun off and merged with the United States Telecommunications Suppliers Association (USTSA) to form what is now known as the Telecommunications Industry Association (TIA).

The minutes from that November 29, 1944, meeting stated that the purpose of the Committee was:

> . . . the setting up of standards of good engineering practice for emergency communication systems. In general, the emphasis was to be placed on general requirements, and no attempts will be made to tie down specific methods to attain the desired ends since it was felt that these methods could best be left to the engineering groups of the interested companies.

The three most important technical issues facing the group were: system band width, transmitter spurious radiation and ignition noise suppression. There was a sense of urgency on the first item, since decisions on frequency allocation were pending at the Federal Communications Commission, the young federal agency formed only ten years before.

The ignition noise suppression problem was under study in separate committees of RMA and the Association of Public-Safety Communications Officials (APCO). The TR-8 group focused their activities on establishing appropriate Subcommittees. One Subcommittee was deemed necessary to explore new applications since it was felt that after the war "light portable walkie-talkie type equipment" would be used for "construction work, hunting and many other allied uses," but only if "licensing requirements were liberalized so that a license for this equipment could be obtained as easily as, say, a hunting license."

**The Subcommittees established on that day were:**

- Subcommittee #1 - System Band Width
- Subcommittee #2 - Ignition Noise
- Subcommittee #3 - Transmitters
- Subcommittee #4 - Receiver Problems
- Subcommittee #5 - New Applications
- Subcommittee #6 - General Utility Point-to-Point Communication

*Members of the Radio Manufacturers Association (now the Electronic Industries Association) Engineering Department, and the Institute of Radio Engineers are pictured here attending the Fall Meeting, held November 13 and 14, 1944, in Rochester, NY. Topics at the Technical Sessions included "Electronic Tube Trends" and "Unpublicized Facts About Frequency Modulation Broadcasting."*

*Working luncheons are standard fare at Committee meetings, like this one from the Fall Meeting of the Radio Manufacturers Association (now the Electronic Industries Association) Engineering Department, and the Institute of Radio Engineers, held November 13 and 14, 1944, in Rochester, NY.*

- Subcommittee #7 - To Obtain General Information and Requirements on Facsimile and Radio Type

Recognizing that standards work is time-sensitive, the group established short turn-around times. Each member of the Committee was given approximately two weeks – until December 15, 1944 – to circulate his contribution on band width to the other members. After receipt of these initial proposals, final recommendations were due to be mailed by January 1st among the Committee members.

It was also noted that membership in the Subcommittees was "open to anyone whether or not they are RMA members." Even today, 50 years later, TIA Engineering Committees are still open to everyone with an interest in the work.

It is quite possible that other Engineering Committees that would be aligned with those of TIA today may have existed before 1944. Perhaps they were created and then disbanded. The records are lost to antiquity. However, research shows that TIA has an active TR-8 Engineering Committee today which had its origins in that New York hotel 50 years ago. Thus, TIA celebrates a proud heritage of 50 years of active standards development for the telecommunications industry. TR-8's roots trace from RMA, through EIA, and, since 1988, to TIA. Join with us in celebrating TIA's Golden Jubilee of active standards work for the industry!

EXHIBIT C

# MOBILE AND PERSONAL PRIVATE RADIO STANDARDS

*Chair: Charles W. Bethards, Patent Attorney, Motorola*

The scope of TR-8 is private radio communications systems, services and equipment, including voice or data applications. Within this industry, TR-8 is responsible for all technical matters and the promulgation of standards in various forms. These standards include system and service definitions along with interoperability, compatibility and compliance requirements for systems and services, in addition to methods of measurement and performance expectations for various elements of the system.

TR-8 is the most senior of all TIA Engineering Committees, with the archives indicating activity by at least 1944. TR-8 promulgated the now widely accepted methods of measurement for land mobile radios. For the better part of three decades, these standards have allowed users of land mobile radios, within the United States and much of the rest of the world, to make meaningful performance comparisons of different manufacturers' radios. TR-8 recently updated these standards to more accurately reflect state-of-the-art equipment and to account for more current spectral allocations. These new or modified methods of measurement, together with definitions and equipment performance specifications, are available in the ANSI/TIA/EIA-603-92 Standard, "Land Mobile FM or PM Communications Equipment Measurement and Performance Standards."

TR-8 and its various Subcommittees meet approximately six times per year. Present activities include:

1) a standard paralleling ANSI/TIA/EIA-603-92 but directed to Amplitude Companded Sideband (ACSB) Systems, such as those employed in the 220 MHz frequency band;

2) a standard directed to an analog data port for land mobile radios;

3) a series of standards and other publications, numbering approximately forty (40) documents and loosely identified as Project 25 (as described below), directed to all aspects of a digital communications system that are particularly suited for public safety applications; and

4) various activities related to technology compatibility issues.

Generally, TR-8 continues to advocate the ANSI/TIA/EIA-603-92 Standard where and when appropriate to various international bodies which influence international standards, such as the International Telecommunication Union (ITU).

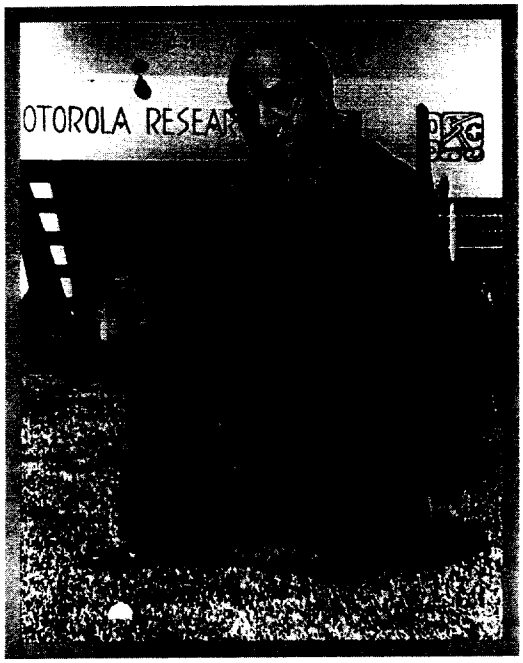
Project 25 is presently consuming the bulk of TR-8's time and talents. The Association of Public-Safety Communications Officials (APCO)-International, Inc.; the National Association of State Telecommunications Directors (NASTD); and Federal Government Agencies (FED), known as APCO/NASTD/FED, will be issuing Common System Standards for digital public safety radio communications (APCO/NASTD/FED Project 25 Standard). TIA, in cooperation with APCO/NASTD/FED, expects to generate Standards, Interim Standards (IS), Specifications and Telecommunications Systems Bulletins (TSBs) that will define equipment and processes necessary for implementation of the APCO/NASTD/FED Project 25 Standard.

The Committee and Subcommittee meetings dealing with Project 25 have been exceptionally

well attended with most of the standards issues hotly contested. Typically, such TIA meetings are attended by representatives from various companies, foreign countries and state and federal government agencies.

Of the approximately 40 documents identified in the Project 25 work program, eight have been published, eleven are presently in a ballot stage and an additional ten should be balloted by the end of 1994 as either Interim Standards or Telecommunications Systems Bulletins. It is expected that Project 25 will continue to be a significant portion of TR-8's activities for the next two years.

One further activity that deserves specific mention is the Technology Compatibility Working Group, WG-8.8, jointly chaired by Dr. Greg Stone representing the Immigration and Naturalization Service (INS) and David Brown from Ericsson General Electric (EGE). This working group has been established specifically to deal with technical matters arising as a result of different communications technologies sharing the same spectrum. It is expected that this working group will become a reference source for the industry and others having concerns related to the technical effects of technological flexibility, as now advocated by many within the industry.




*Dr. Daniel E. Noble, first Chair of the original Standards Committee, TR-8, pictured in 1952. Above photograph and research courtesy of the Motorola Museum of Electronics.*

## SUBCOMMITTEES:

**TR-8.1 Equipment Measurement Procedures**
*Chair: John Oblack, E.F. Johnson Company*

**TR-8.5 Signaling & Data Transmission**
*Chair: Brad Wiseman, Garmin International*

**TR-8.6 Equipment Performance Recommendations**
*Chair: Al Wieczorek, Motorola*

**TR-8.10 Trunking & Conventional Control**
*Chairs: Dr. Rich Comroe, Motorola*
*Ed Kelly, EGE*

**TR-8.11 Antennas**
*Chair: Dale Horn, Allen Telecom Group Inc.*

**TR-8.14 ACSB Standards**
*Chair: Norm Shively, SEA, Inc. of Delaware*

**TR-8.15 Common Air Interface**
*Chair: George Kamerer, Transcript International Ltd.*

## WORKING GROUPS:

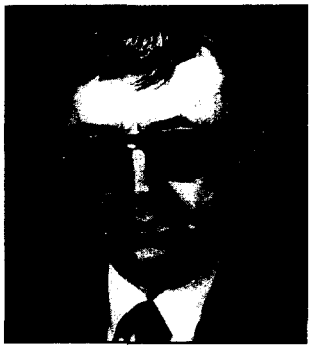
**WG-8.3 Encryption**
*Chair: Eric Ziolko, Motorola*

**WG-8.4 Vocoder**
*Chair: Jim Holthaus, Transcript International Ltd.*

**WG-8.8 Technology Compatibility**
*Chairs: Dr. Greg Stone, INS*
*David Brown, EGE*

# TR-8

## *Mobile and Personal Private Radio Standards*



**George Kamerer**
*Chair, TR-8*
*Consultant, Transcrypt International Ltd.*

The scope of TR-8 is private radio communications systems, services and equipment, including voice or data applications. Within this industry, TR-8 is responsible for all technical matters and the promulgation of standards in various forms. These standards include system and service definitions, along with interoperability, compatibility and compliance requirements for systems and services, in addition to methods of measurement and performance expectations for various elements of the private radio communications system.

The increasing demand for improved service and spectrally efficient systems has given way to significant changes to mobile and personal private radio equipment. The technology modifications proposed to satisfy these demands have resulted in the need to formulate new standards to allow users to effectively implement the fast-paced changes. TR-8, the oldest active standards developing committee within TIA — having begun its work in 1944 — generates the documents necessary to satisfy these user needs.

## 1995 Activities

In 1995, TR-8, its subcommittees, task and working groups held six meetings at concurrent locations, with a number of teleconferences and single group meetings also taking place. Many of the meetings were held coincident with user-group meetings. Activity for 1996 is expected to continue at the same level as 1995.

Activities in 1995 included:

- Maintained and updated existing standards, mainly ANSI/TIA/EIA-603, "Land Mobile FM or PM Communications Equipment Measurement and Performance Standards," covering equipment operating with current technology, during the transition by users to implement new technology;
- Balloted Land Mobile Linear Analog Modulation Communications Equipment Measurement and Performance Standards for narrow band equipment employed in the 220 MHz frequency band;
- Provided a description of an analog port for land mobile radios;
- Developed methods necessary to evaluate the impact of new technology applications;
- Progressed Enhanced Digital Access Communications Systems (EDACS) systems and standards definition;
- Produced Association of Public Safety Communications Officials (APCO) Project 25 supporting standards and other publications.

In continuing to advocate technological flexibility, the Technology Compatibility Working Group was established to deal with the impact of differing technology occupying the same spectrum. This group, chaired by David Brown, Ericsson, and Dr. Greg Stone, U.S. Immigration and Naturalization Service, has been considering the complex issues which can result from spectrum sharing. The group has prepared a preliminary report, with contributions from both industry and users, outlining its efforts to date. The results of this group effort will directly benefit users, regulators and coordinators, as well as equipment and system designers.

TR-8 continues to devote significant effort toward the formulation of APCO Project 25 documents. This effort, coordinated between the APCO/TIA Project 25 Interface Committee (APIC) and the TR-8 structure, has resulted in the release for publication of 20 TIA documents describing equipment and systems applicable to the APCO Project 25 Standard.

The forums provided by both APIC and the TR-8 organization have allowed participation from all facets of users and industry, with an unprecedented cooperation between users and the Committee resulting from this

effort. While many of the standards issues have been hotly contested, the increased sharing of differing points of view has created a legion of solutions and new ideas which will benefit users, industry and ultimately the public at large. As well, many of the documents are being considered as federal standards and parts have been proposed to international standards bodies. This effort will continue in 1996 with major emphasis on system interface designs.

On the international front, TR-8 monitors activity in the international standards arena through attendance at meetings by members in concert with the TIA staff. At present, ANSI/TIA/EIA-603 has been placed on the International Telecommunication Union agenda for international consideration.

Recent changes by the Federal Communications Commission which require new technology to use spectrum efficiently will cause the Committee to consider revising ANSI/TIA/EIA-603 and to focus on the migration to narrower bandwidths in 1996. It is also expected that the Committee will complete its macro system type interface standards. ■

**VICE CHAIR**

**TR-8**

*John Odell*
*K.F. Johnson Company*

**SUBCOMMITTEES:**

**TR-8.1 Equipment Measurement Procedures**
*Chair: John Odell, K.F. Johnson Company*

**TR-8.5 Signaling and Data Transmission**
*Chair: Brad Wiseman, Garmin International*

**TR-8.6 Equipment Performance Recommendations**
*Chair: Al Wieczorek, Motorola*

**TR-8.10 Trunking and Conventional Control**
*Chairs: Dr. Richard Comeau - Motorola*
*Ed Kelly - Ericsson*

**TR-8.11 Antennas**
*Chair: Dale Horn, Allen Telecom Group Inc.*

**TR-8.14 ACSB Standards**
*Chair: Norm Shively - SEA*

**TR-8.15 Common Air Interface**
*Chair (Acting): George Kanaver - Transcrypt International Ltd.*

**WORKING GROUPS:**

**WG-8.3 Encryption**
*Chair: Eric Hulke - Motorola*

**WG-8.4 Vocoder**
*Chair: Jon Holtzman - Transcrypt International Ltd.*

**WG-8.8 Technology Compatibility**
*Chairs: David Brown - Ericsson*
*Dr. Greg Saund - U.S. Immigration and Naturalization*

**TASK GROUPS:**

**TG-8.16 EDACS Task Group**
*Chairs: Dominick Arneri - Ericsson*
*Mike Sarsen - Motorola*

# Mobile and Personal Private Radio Standards

TR-8 is responsible for private radio communications systems, services and equipment, including voice and data applications. Within the telecommunications industry, TR-8 relates to all technical matters and the promulgation of standards in various forms, including system and service definitions, along with interoperability, compatibility and compliance requirements for systems and services. The Committee's most important documents include methods of measurements and performance expectations for various elements of private radio communications systems.

Increasing demand for improved service and spectrally efficient systems is causing significant changes to mobile and personal private radio equipment. The technology changes proposed to satisfy these demands have resulted in the need to formulate new standards essential for users to effectively implement the revolutionary changes. Since 1944, TR-8 has continued in its senior role within TIA to generate the documents necessary to satisfy user needs.

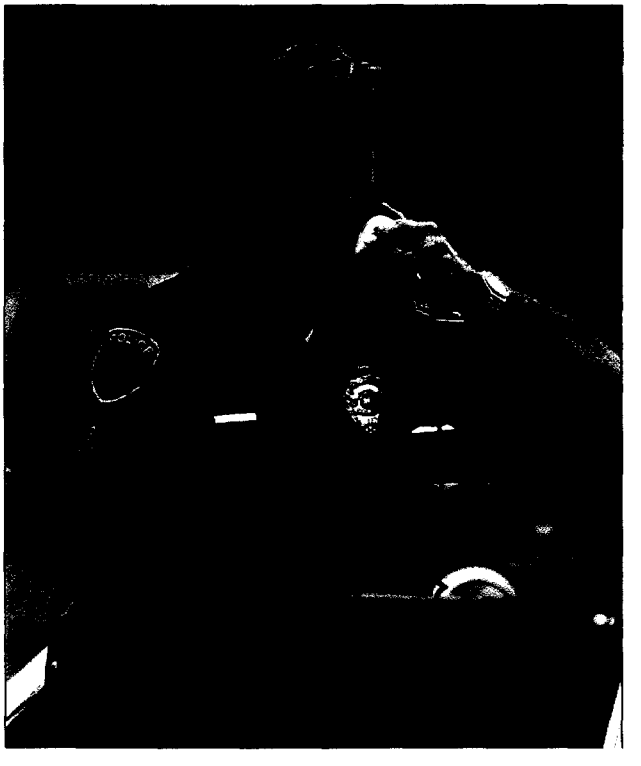
## 1996 Activities

TR-8, its subcommittees, task and working groups held five concurrent meetings, with a number of teleconferences and single group meetings also taking place. Many of these meetings were held coincident with user group meetings. Activity for 1997 will continue at the same or a higher level. Highlights of 1996 work include the following:

- TR-8 published Telecommunciations Systems Bulletin TSB-78, Land Mobile Linear Analog Modulation Communications Equipment Measurement and Performance Standards, for narrow band equipment employed in the 220 MHz frequency band.
- TR-8 continued its work on the development of a description of an analog port for land mobile radios. This port will allow data transmission through conventional FM radios. It is expected that this will permit higher data rates than present methods which use a microphone port. A draft document is currently under consideration.
- Methods necessary to evaluate the impact of new technology applications are the subject of a draft report released by the Committee's Working Group 8.8, Technology Compatibility. The draft report has been distributed to the Federal Communications Commission (FCC) and some frequency coordination activities are underway.
- Task Group 8.16's efforts on the Enhanced Digital Access Communications Systems (EDACS) and standards definition draft continue.
- Documents supporting the Association of Public-Safety Communications Officials (APCO) Project 25 continue to be published. Currently, 31 documents have been approved for publication. These documents now provide a complete description of the Project 25 system, including trunking and interfaces.

During the transition by users to implement new technology, TR-8 is required to maintain and update existing standards, mainly ANSI/TIA/EIA-603, Land Mobile FM or PM Communications Equipment Measurement and Performance Standards, covering equipment operating with current technology. In addition, the FCC has published revised rules for land mobile equipment which will require an addendum to ANSI/TIA/EIA-603, expected to be published in early 1997.

TR-8 monitors activity in the international standards arena through attendance by some Committee members in concert with the TIA staff. At present ANSI/TIA/EIA-603 has been placed on the International Telecommunication Union (ITU) agenda for international consideration.



**George Kamerer**

*Chair, TR-8*
*Consultant,*
*Transcrypt International Ltd.*

## vice chair:

[redacted] John Oblak
*E.F. Johnson Company*

In keeping with the advocacy for technology flexibility, the Technology Compatibility Working Group (WG-8.8) was established to deal with the impact of different technologies sharing the same spectrum. This group, with chairmen David Brown, Ericsson, and Greg Stone, U.S. Immigration and Naturalization Service, considers the complex issues which can result from spectrum sharing. The group has prepared and issued a draft report, with contributions from industry and users. A final report is expected in early 1997. The results of WG-8.8 efforts on shared spectrum will be of direct benefit to users, regulators, coordinators, and equipment and system designers.

TR-8 continues to expend effort toward the formulation of APCO Project 25 documents. This effort, coordinated with the APCO/TIA Interface Committee (APIC), has resulted in the release for publication of documents describing equipment and systems applicable to the APCO Project 25 Standard. The document suite now includes trunking systems as well as interface standards. The Project 25 outcome is the result of unprecedented cooperation between users and TR-8 participants representing the manufacturers. The forums provided by both APIC and TR-8 have allowed participation from all facets of users and industry. While many of the standards issues have been debated, the increased understanding of differing points of view has created a legion of solutions and new ideas which will benefit users, industry and the public at large. Many of the documents are being considered as federal standards and parts of the documents have been proposed to international standards bodies as well. *

## subcommittees:

[redacted] **Equipment Measurement Procedures**
Chair: John Oblak
*E.F. Johnson Company*

[redacted] **Signaling and Data Transmission**
Chair: Brad Wiseman
*Garmin International*

[redacted] **Equipment Performance Recommendations**
Chair: Al Wieczorek
*Motorola, Inc.*

[redacted] **Trunking and Conventional Control**
Chairs: Richard Comroe & Ed Kelly
*Motorola, Inc. & Ericsson*

[redacted] **Antennas**
Chair: Dale Horn
*Allen Telecom Group Inc.*

[redacted] **ACBS Standards**
Chair: Norm Shively
*SEA Inc. of Delaware*

[redacted] **Common Air Interface**
Chair: Alan Wilson
*Motorola, Inc.*

## working groups:

[redacted] **Encryption**
Chair: Eric Ziolko
*Motorola, Inc.*

[redacted] **Vocoder**
Chair: Jim Holthaus
*Transcrypt International Ltd.*

[redacted] **Technology Compatibility**
Chairs: David Brown & Greg Stone,
*Ericsson & U.S. Immigration and Naturalization Service*

## task groups:

[redacted] **EDACS Task Group**
Chairs: Dominick Arcuri & Mike Sasuta
*Ericsson & Motorola, Inc.*

**George Kamerer**
*Chair, TR-8*
*Consultant*
Transcrypt International Ltd.

***Vice Chair:***

John Oblak,
*Transcrypt International/E.F. Johnson*

***Subcommittees:***

**TR-8.1**
**Equipment Measurement Procedures**
**Chair:** John Oblak,
*Transcrypt International/E.F. Johnson*

**TR-8.5**
**Signaling and Data Transmission**
**Chair:** George Kamerer (Acting),
*Transcrypt International Ltd.*

**TR-8.6**
**Equipment Performance Recommendations**
**Chair:** Al Wieczorek, *Motorola Inc.*

**TR-8.10**
**Trunking and Conventional Control**
**Chair:** Richard Comroe, *Motorola Inc.*

**TR-8.11**
**Antennas**
**Chair:** Dale Horn, *Allen Telecom Group Inc.*

**TR-8.14**
**ACSB Standards (Inactive)**
**Chair:** Norm Shively, *SEA Inc. of Delaware*

# TR-8 *Mobile and Personal Private Radio Standards*

COMMITTEE TR-8 ADDRESSES TECHNICAL MATTERS AND standards for private radio communications systems, services and equipment, including both voice and data applications. These standards include system and service definitions, as well as interoperability, compatibility and compliance requirements for systems and services. Among the Committee's most important documents are its performance expectations and methods of measurement for the various elements of private radio communications systems.

The ever-increasing demand for improved service and spectrally efficient systems continues to drive significant change in mobile and personal private radio equipment. The technology modifications proposed to satisfy this demand require that new standards be developed so users can effectively implement the new technology. Committee TR-8 continues to generate the documents necessary to meet such user needs.

## 1997 Activities

Committee TR-8, its Subcommittees and its Task and Working Groups held five concurrent meetings during 1997, in addition to several teleconferences and single group meetings. Many of these meetings were held in conjunction with users' group meetings.

Working Group 8.8, Technology Compatibility, released a report describing the methods necessary to evaluate the impact of new technology applications. The report — *Wireless Communications Systems Performance in Noise and Interference Limited Situations; Recommended Methods for Technology Independent Modeling, Simulation and Verification* — has been incorporated into a Telecommunications Systems Bulletin (TSB) and distributed as a letter ballot. Ballot results indicate that the TSB has been approved and will be published in early 1998.

Efforts continued on the Enhanced Digital Access Communications Systems (EDACS) Systems and Standards Definition (SSD) draft in Task Group 8.16 EDACS. The group forwarded an SSD document to TR-8 for consideration as a TSB. It has been balloted, and ballot comments were considered in late 1997.

During 1997, Committee TR-8 formed a new Subcommittee, TR-8.17, Radio Frequency (RF) Exposure, to establish repeatable measurement methods for RF exposure. The purpose of this effort is to develop consistent methods for measuring RF exposure when determining compliance with the Federal Communications Commission's (FCC) RF exposure limits.

The Committee continued its work on developing a description of a data port for Frequency Modulated (FM) land mobile radios. The port will allow data transmission through conventional FM radios and is expected to permit higher data rates than current methods which use the microphone port. A draft document is under consideration.

The Committee also continued to devote significant resources to developing Project 25 documents. This effort, coordinated between the TIA Ad Hoc Project 25 Interface Committee (APIC) and TR-8, has resulted in documents that describe the equipment and systems applicable to the Project 25 standard. The document suite includes descriptions of trunking systems, as well as interface standards, and as of late 1997, 31 documents had been approved for publication. The Common Air Interface was balloted during 1997 as a Standards Proposal for an American National Standard. Also, the Committee issued ballots for four data documents. Those ballot comments will be discussed at the scheduled 1998 meetings. Many of the Project 25 documents are being considered as federal standards, and portions of them have been proposed to international standards bodies.

The Project 25 outcome is the result of unprecedented cooperation between users and manufacturers. Forums offered by APIC and Committee TR-8 have allowed participation by all interested parties, and while many of the standards issues have been heavily debated, the increased understanding of differing viewpoints has created a host of new ideas and solutions that will benefit not only users and manufacturers, but also the public at large.

TR-8 develops standards for new technologies, but it also must update and maintain existing standards while users are making the transition to the new technology. One such standard that covers equipment operating with current technology is ANSI/TIA/EIA-603, *Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*. During 1997, the Committee published an addendum to ANSI/TIA/EIA-603 to incorporate the FCC's revised rules for land mobile equipment.

Committee TR-8 additionally monitors activities in the international standards arena by having Committee representatives join the TIA staff in attending International Telecommunication Union (ITU) meetings. ■

TR-8.15
**Common Air Interface**
**Chair:** Alan Wilson, *Motorola Inc.*

TR-8.17
**RF Exposure**
**Chair:** Dominick Arcuri, *Ericsson Inc.*

### *Working Groups:*

WG-8.3
**Encryption**
**Chair:** Eric Ziolko, *Motorola Inc.*

WG-8.4
**Vocoder**
**Chair:** Jim Holthaus,
*Transcrypt International Ltd.*

WG-8.8
**Technology Compatibility**
**Chairs:** David Brown, *Ericsson Inc.*
Greg Stone, *U.S. Immigration and Naturalization Service*

### *Task Groups:*

TG-8.16
**EDACS Task Group**
**Chairs:** Dominick Arcuri, *Ericsson Inc.*
Mike Sasuta, *Motorola Inc.*

EXHIBIT D

**FIBER OPTICS, WAVEGUIDES, SPECIFICATIONS (cont.)**

**EIA/TIA-492BB00**
***Blank Detail Specification for Class IVb Dispersion, Shifted Single-Mode Optical Waveguide Fibers (ANSI/EIA/TIA-492BB00-89)***
This document is a guide to be used in the preparation of Detail Specification for class IVb Dispersion - Shifted Single - Mode Optical Waveguide Fibers.
**Product Code 3** Oct, 1989 **COMMITTEE:FO-6.6**
**$38.00**

**TIA/EIA-492C000**
***Sectional Specification for Class IVa Dispersion-Unshifted Single-Mode Optical Fibers (ANSI/TIA/EIA-492C000-97)***
This Specification forms a part of a set of TIA/EIA standards that systematically specifies performance requirements for optical fiber. This hierarchical specification system comprises four tiers: generic specifications, sectional specifications, blank detail specifications, and detail specifications. This specification applies to Class IVa dispersion-unshifted single-mode optical fibers with glass core and cladding. The requirements of product, testing, and specification documents are defined so that one can prepare a detail specification.
**Product Code 3** Jan, 1998 **COMMITTEE:FO-6.6**
**$39.00**

**TIA/EIA-492CA00**
***Blank Detail Specification for Class IVa Dispersion-Unshielded Single Mode Optical Fibers (ANSI/TIA/EIA-492CA00-97)***
This Specification pertains specifically to Class IVa dispersion-unshifted single-mode optical fiber. This Specification is a supplementary document to Sectional Specification TIA/EIA-492C000 and contains requirements for style, layout, and minimum content of a Detail Specification written for Class IVa fibers.
**Product Code 3** Jan, 1998 **COMMITTEE:FO-6.6**
**$53.00**

**EIA-492CAAA**
***Detail Specification for Class IVa Dispersion-Unshifted Single-Mode Optical Fibers (ANSI/TIA/EIA-492CAAA-98)***
This Specification enables end users and manufacturers of fiber-optic cable to specify the choice of single-mode optical fiber contained in the cable.
**Product Code 3** May, 1998 **COMMITTEE:FO-6.6**
**$46.00**

**TIA/EIA-492E000**
***Sectional Specification for Class IVd Nonzero-Dispersion Single-Mode Optical Fibers for the 1550 nm Window (ANSI/TIA/EIA-492E000-96)***
This specification was formulated for the purpose of providing a document setting forth engineering and use requirements as necessary for purpose of Class IVd nonzero-dispersion single-mode optical fibers for the 1550 nm window. Use of this document is intended to eliminate misunderstandings or confusion between the supplier and user with respect to product performance requirements and test procedures.
**Product Code 3** Nov, 1996 **COMMITTEE:FO-6.6**
**$41.00**

**TIA/EIA-492EA00**
***Blank Detail Specification for Class IVd Nonzero-Dispersion Single-Mode Optical Fiber for the 1550 nm Window (ANSI/TIA/EIA-492EA00-96)***
This specification is a supplementary document to sectional specification TIA/EIA-492E000 and contains requirements for style, layout and minimum content of detail specifications written for Class IVd fibers.
**Product Code 3** Nov, 1996 **COMMITTEE:FO-6.6**
**$62.00**

## LAND MOBILE COMMUNICATIONS

**TIA/EIA-603-1**
***Addendum to TIA/EIA-603 (ANSI/TIA/EIA-603-1-98)***
This Standard updates information contained in Standard ANSI/TIA/EIA-603 as a result of recent FCC and NTIA regulatory changes. Relevant regulatory documents include FCC 95-255, plus its Erratum, and FCC 96-492, all of which deal with narrowband/refarming, and FCC 95-501, which established economic area SMR service.
**Product Code 3** Mar, 1998 **COMMITTEE:TR-8.6**
**$33.00**

**TIA/EIA/IS-102.AAAA-A**
***APCO Project 25 DES Encryption Protocol***
This DES encryption protocol document defines the operation of encryption and decryption in a way that is compatible with information transfer through an APCO Project 25 standard system, especially, through the common air interface of such a system.
**Product Code 3** Feb, 1997 **COMMITTEE:TR-8**
**$46.00**

**TIA/EIA/IS-102.BABA**
***APCO Project 25 Vocoder Description***
This document specifies the voice coding method for the Project 25 System and Standard Definition IS-102 (originally published as a TSB). It describes the functional requirements for the transmission and reception of voice information using digital communication media described in the standard. This document is specifically intended to define the conversion of voice from an analog representation to a digital representation that consists of a net bit rate of 4.4kbps for voice information, and a gross bit rate of 7.2 kbps after error control coding. This standard is compatible with the requirement for voice communication over the Project 25 Common Air Interface (TIA Document No. 102.BAAA).

The voice coder (or vocoder) presented in this document is intended to be used throughout Project 25 in any equipment that requires an analog-to-digital or digital-to-analog voice interface. Specifically, mobile, and portable radios as well as console equipment and gateways to voice networks may contain the vocoder described in this document. The reader is referred to the Project 25 Shell Standard for additional information on the integration of the vocoder into the overall communication system.
**Product Code 3** Aug, 1993 **COMMITTEE:TR-8**
**$125.00**

**LAND MOBILE COMMUNICATIONS (cont.)**

**TIA/EIA/IS-102.BABB-A**
***APCO Project 25 Vocoder Mean Opinion Score Conformance Test***
This standard details definitions and methods of measurement for test conformance of speech codecs used in APCO Project 25 Digital Land Mobile Radio Equipment to the reference speech codec defined for Project 25. The purpose of this standard is to assure that a speech codec in any given piece of Project 25 Equipment is compliant with IS-102.BABA.
**Product Code 3** (Dec. 1995) **COMMITTEE:TR-8**
**$87.00**

**TIA/EIA/IS-102.BABC**
***APCO Project 25 Vocoder Reference Test***
This document specifies one method that may be employed to test that implementation of IS-102.BABA compatible speech codecs meet minimum performance requirements.
**Product Code 3** Jun, 1996 **COMMITTEE:TR-8**
**$52.00**

**TIA/EIA/IS-102.BADA**
***Telephone Interconnect Requirements and Definitions (Voice Service)***
This document defines the requirements for telephone voice interconnect for Land Mobile Radio systems. This document only applies to those features of a telephone interconnect service which are necessary for basic telephone functionality.
**Product Code 3** May, 1996 **COMMITTEE:TR-8**
**$41.00**

**TIA/EIA/IS-102.BAEC**
***Project 25 Circuit Data Specification New Technology Standards Project Radio Technical Standards***
This document serves to define the detailed interfaces, protocols and procedures involved in interfacing with a data-capable Project 25 standard radio unit via the standard mobile data peripheral interface (A), and, optionally, a Project 25 standard fixed network equipment (FNE) data end-system interface.
**Product Code 3** Jan, 1998 **COMMITTEE:TR-8**
**$66.00**

**TIA/EIA/IS-102.BAEE**
***Radio Control Protocol (RCP)***
This document defines a radio control protocol (RCP) for use in land mobile digital radio systems.
**Product Code 3** Jan, 1998 **COMMITTEE:TR-8**
**$44.00**



**TSB88**
***Wireless Communication Systems - Performance in Noise and Interference-Limited Situations - Recommended Methods for Technology-Independent Modeling, Simulation, and Verification***
This Bulletin gives guidance on the following areas: establishment of standardized methodology for modeling and simulating narrowband/bandwidth efficient technologies operating in a post "refarming" environment; establishment of a standardized methodology for empirically confirming the performance of narrowband/bandwidth efficient systems operating in a post "refarming" environment; and aggregating the modeling, simulation and empirical performance verification reports into a unified "spectrum management tool kit" which may be employed by frequency coordinators, systems engineers and system operators. The purpose of this document is to define and advance a scientifically sound standardized methodology for addressing technology compatibility. This document provides a formal structure and quantitative technical parameters from which automated design and spectrum management tools can be developed based on proposed configurations that may temporarily exist during a migration process or for longer term solutions for systems that have different technologies.
**Product Code 3** Jan, 1998 **COMMITTEE:TR-8**
**$124.00**

**TIA/EIA TSB102 Series**
***Telecommunications, Land Mobile Communications (APCO/Project 25)***
This series is a combination of all interim standards and telecommunications systems bulletins which are related to APCO/Project 25.
**Product Code 3**
**$2,135.00**

**TSB102-A**
***APCO Project 25, Systems and Standards Definition***
The APCO Project 25 System and Standards Definition provides, in a general way, a definition and description of an APCO Project 25 system's architecture, interfaces and system elements. General expectations of the APCO Project 25 system and the organization of a family of APCO Project 25 standards and bulletins are included in this document. More detailed APCO Project 25 information is included in the individual APCO Project 25 standards and bulletins.
**Product Code 3** Nov, 1995 **COMMITTEE:TR-8**
**$124.00**

**TSB102.AAAB**
***APCO Project 25 - Security Services Overview - New Technology Standards Project - Digital Radio Technical Standards***
A general land mobile radio communications system consists of subscriber units, base stations and other fixed equipment for single-site to wide area operation and console operator positions, and computer equipment. This document provides an overview of the security services available in Land Mobile Radio systems. It provides the context in which to understand why security services are required and gives a general high level description of how they are provided.
**Product Code 3** Jan, 1996 **COMMITTEE:TR-8**
**$46.00**

**LAND MOBILE COMMUNICATIONS (cont.)**

**TSB102.AABA**
***APCO Project 25 Trunking Overview***
APCO Project 25 digital radio systems will optionally support a trunking mode of operation. This document provides an overview of the essential attributes of the trunking mode of operation such that, where systems are configured in the trunking mode, voice and data services will operate in accordance with the goals of the APCO Project 24. Trunking is needed in order to support access control over resources ranging all dimensions from single site single station, to multiple site single station, to multiple station single site, to multiple station multiple site. Additionally, the trunking system must support all required services, which may cover such areas as data, voice, protected data, protected voice, flexible group structures, and telco interconnect.
**Product Code 3** Apr, 1995 **COMMITTEE:TR-8.10**
**$31.00**

**TSB102.AABB**
***APCO Project 25 - Trunking Control Channel Formats***
This document defines the general control channel structures to be employed on the APCO Project 25 trunking control channel.
**Product Code 3** Nov, 1996 **COMMITTEE:TR-8.10**
**$44.00**

**TSB102.AABC**
***APCO Project 25 - Trunking Control Channel Messages - New Technology Standards Project - Digital Radio Technical Standards***
This document defines the messages to control trunking system operation on the common interface for APCO Project 25. It defines overall structure of the messages and several of the common fields, as well as categorizes messages into voice, data, control and status.
**Product Code 3** Nov, 1996 **COMMITTEE:TR-8.10**
**$129.00**

**TSB102.AABD**
***APCO Project 25 Trunking Procedures - New Technology Standards Project - Digital Radio Technical Standards***
This document details the procedures needed to be followed by both trunked subscriber units (mobile, portable and fixed) and the trunked system to which the subscriber units are connected. These procedures are required to permit interoperability.
**Product Code 3** Oct, 1997 **COMMITTEE:TR-8.10**
**$110.00**

**TSB102.AABF**
***APCO Project 25 - Link Control Word Formats and Messages - New Technology Standards Project - Digital Radio Technical Standards***
This document shall provide information that is necessary for the formats and messages for the Link Control Words for both conventional and trunking operation. Link Control Words are code words that encodes 9 octets of information.
**Product Code 3** May, 1996 **COMMITTEE:TR-8.10**
**$46.00**

**TSB102.AABG**
***APCO Project 25 - Conventional Control Messages - New Technology Standards Project - Digital Radio Technical Standards***
APCO Project 25 applies to both conventional and trunked systems. The distinction between conventional and trunking systems may be that trunking systems include a centralized controlling device which is used to assign channels to subscribers as service is demanded.This controlling device is absent in a conventional system. A large set of useful functions are defined for trunking systems, including but not limited to the functions necessary for subscribers to request service and for the controller to grant service. Trunking also defines functions which may be applied to conventional systems, such as an Emergency Alarm. This document is intended to name those functions that are defined for trunking which may be applied to conventional systems.
**Product Code 3** Jul, 1996 **COMMITTEE:TR-8.10**
**$33.00**

**TSB102.AACA**
***APCO Project 25 - Over-The-Air-Rekeying (OTAR) Protocol - New Technology Standards Project - Digital Radio Technical Standards***
Part of the APCO Project 25 standard, this section covers Over-the-Air-Rekeying (OTAR) protocol for unclassified sensitive government communications. Readers should have knowledge of the Project 25 standard to make use of this document. OTAR is a method of encrypting and sending the encryption keys through the Common Air Interface (CAI) in privacy. This document defines protocol and sets forth procedures to implement OTAR in radios conforming to Project 25 standards. Key management functions are described at a conceptual level.
**Product Code 3** Jan, 1996 **COMMITTEE:TR-8**
**$143.00**

**TSB102.BAAA**
***APCO Project 25, Recommended Common Air Interface***
This document describes the access method, bandwidth, modulation, data rate, and message format for radios meeting the Project 25 requirements.
**Product Code 3** Apr, 1994 **COMMITTEE:TR-8.15**
**$95.00**

**TSB102.BAAB-A**
***APCO Project 25 Common Air Interface Conformance Test***
This document lists a series of conformance tests for the Common Air Interface, defined in reference 2. These tests are intended to assure the equipment actually conforms to the formats specified in the Common Air Interface. The object of the conformance tests is to assure the equipment may be interoperable with other equipment conforming to the standard. These tests are different and distinct from performance test, given in reference 5, which measure the actual limits of equipment performance. The performance and conformance test are mutually complementary. These tests are also different and distinct from lock down tests, which are intended to demonstrate interoperability between different radios. These conformance tests are intended to precede lock down tests.
**Product Code 3** Aug, 1995 **COMMITTEE:TR-8.15**
**$147.00**

**LAND MOBILE COMMUNICATIONS (cont.)**

**TSB102.BAAC-A**
***APCO Project 25 Common Air Interface Reserved Values***
This document is a supplement to the Common Air Interface that lists all of the reserved values for the fields of information. It should be interpreted with the Common Air Interface and is not intended to be understood by itself.
**Product Code 3** Dec, 1995 **COMMITTEE:TR-8.15**
**$35.00**

**TSB102.BAAD**
***APCO Project 25 Common Air Interface Operational Description for Conventional Channels***
TSB102.BAAD serves as a supplement to the Common Air Interface and describes some simple operational procedures for conventional systems using voice or data. These procedures are sufficient for basic operation of conventional radio systems. The basic procedures defined in TSB102.BAAD include those for transmitting and receiving digital voice on a radio channel, and basic conventional systems are classed as either repeater systems or direct systems.
**Product Code 3** Oct, 1994 **COMMITTEE:TR-8.15**
**$46.00**

**TSB102.BABD**
***APCO Project 25 Vocoder Selection Process***
This document describes the evalation procedure to be employed in the assessment of various digital voice coding technology proposals for Project 25.
**Product Code 3** May, 1996 **COMMITTEE:TR-8**
**$143.00**

**TSB102.BACA**
***Inter-RF Subsystem Interface Messages Definition - New Technology Standards Project - Digital Radio Technical Standards***
This document defines a basic set of high-level messages to be utilized on the APCO Project 25 Interswitching Interface (ISSI) to accomplish the necessary mobility for subscriber units and mandatory standard services across the country.
**Product Code 3** Dec, 1996 **COMMITTEE:TR-8**
**$60.00**

**TSB102.BACC**
***Project 25 - Inter-RF - Subsystem Interface Overview - New Technology Standards Project - Digital Radio Technical Standards***
This document provides an overview of the essential attributes of the ISSI such that, where APCO Project 25 communication systems are configured to include more than a single radio frequency subsystem (RFSS), the communication system will function and operate in accordance with the goals of APCO Project 25.
**Product Code 3** Dec, 1996 **COMMITTEE:TR-8**
**$34.00**

**TSB102.BAEA**
***APCO Project 25 - Data Overview - New Technology Standards Project - Digital Radio Technical Standards***
This Bulletin serves the need to permit an APCO Project 25 radio and radio system to support circuit and packet data. When an APCO Project 25 radio system supports data, it will be as this document specifies. Additionally, this document serves the requirement to transport TCP/IP, X.25 and SNA. In order to keep the complexity of the APCO Project 25 radio to a minimum while supporting such a broad requirement, it is necessary that the radios support a circuit, and only a single standard packet interface.
**Product Code 3** Jul, 1995 **COMMITTEE:TR-8.5**
**$35.00**

**TSB102.BAEB**
***APCO Project 25 - Packet Data Specification - New Technology Standards Project - Digital Radio Technical Standards***
This document serves to define the detailed interfaces, protocols, and procedures involved in interfacing with a data capable APCO Project 25 standard radio unit via the standard mobile data peripheral interface (A) and optionally an APCO Project 25 standard Fixed Network Equipment data end-system interface. Defined are circuit services, in all 3 configurations are: radio-radio, radio-repeater, and radio-FNE (Fixed Network Equipment), supported by point-to-point radio data peripheral interfaces (A). The data services mapping to APCO 25 Common Air Interface formats are defined, which may be provided across conventional or trunked service channels. At this time this does not include a multipoint A interface, or low speed data, which is data embedded in voice.
**Product Code 3** Jul, 1995 **COMMITTEE:TR-8.5**
**$50.00**

**TSB102.BAEC**
***APCO Project 25 - Circuit Data Specification - New Technology Standards Project - Digital Radio Technical Standards***
This document serves to define the detailed interfaces, protocols, and procedures involved in interfacing with a data capable APCO Project 25 standard radio unit via the standard mobile data peripheral interface (A) and optionally an APCO Project 25 standard Fixed Network Equipment data end-system interface. Defined are circuit services, in all 3 configurations are: radio-radio, radio-repeater, and radio-FNE (Fixed Network Equipment), supported by point-to-point radio data peripheral interfaces (A).
**Product Code 3** Jul, 1995 **COMMITTEE:TR-8.5**
**$61.00**

**TSB102.BAFA**
***APCO Project 25 Network Management Interface***
This Bulletin specifically addresses the Network Management Interface. Its objective is to define the interface between one or more Radio Frequency (RF) Sub-systems and an attached network management Manager or other interconnected network management system.
**Product Code 3** Dec, 1994 **COMMITTEE:TR-8**
**$35.00**

## LAND MOBILE COMMUNICATIONS (cont.)

### C4FM/CQSK

**TIA/EIA/IS-102.CAAA**
***Digital C4FM/CQPSK Transceiver Measurement Methods***
This standard provides definition, methods of measurement and performance standards for radio equipment used in the private (dispatch) land mobile services that employ C4FM or CQSK modulation for transmission and reception of voice or data using digital techniques, with or without encryption, with a maximum frequency of 1 GHz or less.
**Product Code 3** May, 1997 **COMMITTEE:TR-8.1**
**$148.00**

### ENCRYPTION

**TIA/EIA/IS-102.AAAC**
***Conformance Test for the Project 25 DES Encryption Protocol - New Technology Standards Project - Digital Radio Technical Standards***
This DES encryption protocol document describes the following items that are necessary for encryption protocol: encryption algorithm, operating mode, key variable, initialization vector and message indicator. This protocol is compatible with either voice or data messages and can be transported through a radio network using common air interface.
**Product Code 3** Feb, 1997 **COMMITTEE:TR-8**
**$98.00**

### OVER-THE-AIR REKEYING (OTAR)

**TIA/EIA/IS-102.AACB**
***Over-The-Air-Rekeying (OTAR) Operational Description - New Technology Standards Project - Digital Radio Technical Standards***
This interim standard provides an operational description of OTAR. Its purpose is to describe, in relatively simple terms, the various complex over-the-air-rekeying messages and procedures. This interim standard is meant to be used in conjunction with an OTAR protocol standard, and a basic familiarity with an OTAR protocol standard is helpful to interpret this operational description.
**Product Code 3** Mar, 1998 **COMMITTEE:TR-8.6**
**$59.00**

**TSB102.AACC**
***Conformance Tests for the Project 25 Over-The-Air-Rekeying (OTAR) Protocol - New Technology Standards Project - Digital Radio Technical Standards***
This document provides a series of conformance tests for the APCO Project 25 Over-The-Air-Rekeying (OTAR) protocol. These tests are intended to assure that the equipment conforms to the message formats specified in the OTAR protocol document and that the equipment is interoperable with other equipment conforming to the standard.
**Product Code 3 Feb, 1997 COMMITTEE:TR-8**
**$135.00**

### PRIVATE RADIO (APCO/PROJECT 25)

**TIA/EIA-102.BAAA**
***Project 25 FDMA Common Air Interface - New Technology Standards Project - Digital Radio Technical Standards (ANSI/TIA/EIA-102.BAAA-98)***
This document is part of the APCO/Project 25 series. This document provides an overview of the standardized set of data communication services such that data connectivity will operate in accordance with any Project 25 radio and across any Project 25 digital radio system. The document describes all of the parts of a system for public safety land mobile radio communications. These systems have subscriber units (which include portable radios for hand held operation and mobile radios for vehicular operation), base stations (for fixed installations), and other fixed equipment (for wide-area operation and console operator positions), as well as computer equipment (for data communications). There are interfaces between each of these equipment items. The Common Air Interface allows these radios to send and receive digital information over a radio channel.
**Product Code 3** May, 1998 **COMMITTEE:TR-8.15**
**$94.00**

**TIA/EIA-102.BABA**
***Project 25 Vocoder Description (ANSI/TIA/EIA-102.BABA-98)***
This document specified the voice coding method for the Project 25 System and Standard Definition IS102 (originally published as a TSB). It describes the functional requirements for the transmission and reception of voice information using digital communication media described in the standard. This document is specifically intended to define the conversion of voice from an analog representation.
**Product Code 3** May, 1998 **COMMITTEE:TR-8**
**$129.00**

**TIA/EIA/IS-102.AABC**
***Project 25 Trunking Control Channel Messages - New Technology Standards Project - Digital Radio Technical Standards***
This document is part of the APCO/Project 25 series. This document provides an overview of the standardized set of data communication services such that data connectivity will operate in accordance with any Project 25 radio and across any Project 25 digital radio system. The document describes the presentation on the trunking system with respect to the Inbound Signaling Packet (ISP) and Outbound Signaling Packet (OSP) of the control channel.
**Product Code 3** Mar, 1998 **COMMITTEE:TR-8.10**
**$142.00**

LAND MOBILE COMMUNICATIONS, PRIVATE RADIO (APCO/PROJECT 25) (cont.)

**TIA/EIA/IS-102.BAEA**
***Project 25 Data Overview - New Technology Standards Project***
This document is part of the APCO/Project 25 series. This document provides an overview of the standardized set of data communication services such that data connectivity will operate in accordance with any Project 25 radio and across any Project 25 digital radio system. The document describes circuit and packet data. Additionally, the description serves the requirement to transport multiple packet protocols, including TCP/IP, X.25 and SNA. The APCO 25 system defines 2 different categories of data services in 3 different categories of data configurations for a total of 6 distinct service/configuration combinations. This document does not include a multipoint A interface, or low speed data, which is data embedded in voice.
**Product Code 3** Jan, 1998 **COMMITTEE:TR-8**
**$32.00**

**TIA/EIA/IS-102.BAEB**
***Project 25 Packet Data Specification - New Technology Standards Project - Digital Radio Technical Standards***
This document is part of the APCO/Project 25 series. This specification serves to define the detailed interfaces, protocols, and procedures involved in interfacing with a data capable Project 25 standard radio unit via the standard mobile data peripheral interface (A), and (optionally) a Project standard FNE (Fixed Network Equipment) data end-system interface (ED). Defined are packet services, in all 3 configurations: radio-radio, radio-repeater, and radio-FNE (Fixed Network Equipment), supported by point-to-point radio data peripheral interfaces (A). The data services mapping to Project 25 CAI formats are defined, which may be provided across conventional or trunked service channels.
**Product Code 3** Apr, 1998 **COMMITTEE:TR-8**
**$56.00**

**TSB69.3**
***Enhanced Digital Access Communications Systems (EDACS) Digital Air Interface for: Channel Access, Modulation, Messages, and Formats***
Radio frequency (RF) signaling within the EDACS is discussed in this document and includes both digital trunking control channel and working channel signaling structures and message formats. The purpose of this document is to define the digital signaling process to be used for trunking control and voice communications. Voice communication includes channel access, modulation, addressing, and working channel formats and messages, as well as error correction. This document is part of the TSB 69 series and other parts will soon be published.
**Product Code 3** Apr, 1998 **COMMITTEE:TR-8.15**
**$94.00**

## LAND MOBILE, EQUIPMENT

**EIA-374-A**
***Land Mobile Signaling Standard***
This Standard has focus on key areas of signaling sensitivity, falsing, and potentially degrading interference modes. Many signaling parameters require no testing, but are merely descriptive in nature. Nevertheless, these parameters should be specified in order to allow intelligent comparison of systems. A generalized signaling system is shown and defined to clarify terminology. Some of the descriptive parameters are also listed in this Standard and briefly defined.
**Product Code 3** Mar, 1981 **COMMITTEE:TR-8.5**
**$69.00**

**EIA-450**
***Standard Form for Reporting Measurements of Land Mobile, Base Station, and Portable/Personal Radio Receivers in Compliance with FCC Part 15 Rules***
This Standard reporting form has been developed at the suggestion of the FCC. Its purpose is to provide a uniform method of making and reporting the summary of measurements outlined in the above title of the standard. This form is not complete in itself. It supplements the Part 15 Rules and must be used in conjunction with them.
**Product Code 3** Sep, 1978 **COMMITTEE:TR-8.2**
**$50.00**

**TIA/EIA-603**
***Land Mobile FM or PM Communications Equipment Measurement and Performance Standards (ANSI/TIA/EIA-603-93)***
The object of this Standard is to standardize parameter titles, definitions, the test conditions, and the methods of measurement used to ascertain the performance of equipment within the scope of this standard, and to make possible a meaningful comparison of the results of measurements made by different observers and on different equipment.

This Standard has the further objective of providing separate performance standards for base stations, mobiles, and portable equipment, while retaining common definitions and methods of measurement for parameters that are common to these equipment.
**Product Code 3** Feb, 1993 **COMMITTEE:TR-8**
**$217.00**

**TSB30**
***Sideband Spectrum Measurement Procedure for Transmitters Not Equipped with Audio Low-Pass Filter***
This document contains a measurement procedure for use in demonstrating compliance with FCC bandwidth limitation requirements for transmitters that are not equipped with an audio low-pass filter. The term "Transmitter Sideband Spectrum" denotes the level of sideband energy measured in a specified receiver bandwidth over a specified frequency displacement range due to all forms of intended modulation and from sources of unwanted noise within the transmitter.
**Product Code 3** Apr, 1990 **COMMITTEE:TR-8.1**
**$30.00**

**TSB48**
***Method of Measurement for Land Mobile Receiver Impulse Blanking Effectiveness***
This document is to be used in conjunction with TIA/EIA-603 Standard.
**Product Code 3** Aug, 1992 **COMMITTEE:TR-8.2**
**$26.00**

**TSB57**
***Sideband Spectrum Measurement Procedure for Transmitters Intended for Use in the 220-222 MHz Band***
The following measurement procedure shall be used to demonstrate compliance with FCC bandwidth limitation requirements for transmitters intended for use in the 220-222 MHz band. Transmitters used in this frequency band will operate on 5 kHz channels and a maximum authorized bandwidth of 4 kHz. Assignable frequencies represent the center of the authorized bandwidth.
**Product Code 3** Feb, 1993 **COMMITTEE:TR-8.1**
**$26.00**

LAND MOBILE, EQUIPMENT (cont.)

**TSB78**
***Land Mobile Linear Analog Modulation Communications Equipment Measurement and Performance Standards***
This document aims to standardize parameter titles, definitions, test conditions and the methods of measurement used to ascertain the performance of radio equipment used in the Land Mobile Services that employ linear analog modulation techniques. These include, but are not limited to, tone above band single sideband (TAB), transparent tone in band single sideband (TTIB), and real zero single sideband (RZ™SSB). Harmonizing methods of measurement for base stations, mobiles, and portable/personal equipment is also a goal, and separate standards for these, as an entity, have been included toward this end.
**Product Code 3** Sep, 1996 **COMMITTEE:TR-8.14**
**$174.00**

## MICROWAVE, POINT-TO-POINT

**EIA-166**
***Miniature Waveguide Flanges, Unpressurized Contact Type***
This Standard pertains to miniature unpressurized contact flanges for use with rectangular waveguides as specified in EIA-261-B. It contains a list of waveguides flange assemblies with pertinent drawing dimensions.
**Product Code 3** May, 1962 **COMMITTEE:TR-14.12**
**$26.00**

**EIA-200-A**
***Circular Waveguides (ANSI/EIA-200-A-69)***
This Standard contains 38 EIA designations for rigid circular waveguides along with standard dimensions, tolerances and frequency ranges. Inside diameters range from .094 to 25.508 inches.
**Product Code 3** Aug, 1975 **COMMITTEE:TR-14.12**
**$26.00**

**EIA-210**
***Terminating and Signaling Equipment for Microwave Communication Systems, Part 1: Telephone Equipment***
The Standard included herein are for terminating and signaling equipment to be used in telephone service. Because there are so many accepted practices in the telephone industry, each devised to meet pertinent requirements in specific situations, it is difficult to reduce these practices to a single standard. Where it appears impractical to establish a numerical value for a standard, examples of current practices, or informative notes on relative importance are given. A list of applicable terms, their sponsors and references are included.
**Product Code 3** Aug, 1958 **COMMITTEE:TR-14**
**$26.00**

**EIA-252-A**
***Standard Microwave Transmission Systems***
The purpose of this Standard is to make it possible to describe the baseband characteristics of the radio and multiplex equipment to allow evaluation of their compatibility. This standard applies to the characteristics of the transmission path between the multiplex baseband send terminals and multiplex receiver terminals in both directions of transmission. This is a COMPANION document to EIA-250-B.
**Product Code 3** Sep, 1972 **COMMITTEE:TR-14.1**
**$52.00**

**EIA-261-B**
***Rectangular Waveguides (WR3 to WR2300)***
This Standard contains 34 EIA designations for rigid rectangular waveguides; along with standard dimensions and frequency ranges.
**Product Code 3** May, 1979 **COMMITTEE:TR-14.12**
**$26.00**

**EIA-271-A**
***Waveguide Flanges, Pressurizable Contact Types for Waveguide Sizes WR90 to WR2300***
Section I of this Standard pertains to pressurizable contact flanges for use with rectangular waveguides as specified in the latest issue of EIA-261, Section II pertains to contact flanges for sizes WR770 through WR2300. The Standard contains a list of pertinent drawings of waveguide flange assemblies utilizing two types of pressurizing gaskets. By specifying assembly dimensions in lieu of detail part drawings, it provides for interchangeability and permits manufacturing flexibility with regard to the method of joining the flange to the waveguide.
**Product Code 3** Nov, 1963 **COMMITTEE:TR-14.12**
**$50.00**

**EIA-285**
***Waveguide Flanges, Dual Contact Pressurizable and Miniature Type for Waveguide Sizes WR90 to WR975***
This Standard pertains to waveguide flanges where two waveguides are in close proximity such as short slot hybrid, dual TR tubes, etc., and provides a dual contact pressurizable flange for use with two rectangular waveguides per EIA-261. It also provides for a miniature version for the waveguide sizes from WR90 to WR284. Drawings and tables showing the actual dimensions are given.
**Product Code 3** Nov, 1963 **COMMITTEE:TR-14.12**
**$26.00**

**EIA-298**
***Audio Transmitter Input Impedances for Single Input Transmitters***
This Standard specifies the audio input impedance of radio transmitters for broadcasting regardless of the type of modulation.
**Product Code 3** (Jul. 1955; Reaffirmed Apr. 1964)
**COMMITTEE:TR-8**
**$26.00**

**EIA-304**
***Ridge Waveguides***
This Standard pertains to both single ridge and double ridge waveguides, having bandwidth ratios of 2.4 to 1 and 3.6 to 1.
**Product Code 3** Feb, 1965 **COMMITTEE:TR-14.12**
**$26.00**

**TSB10-F**
***Interference Criteria for Microwave Systems***
TSB10-F, a revision of TSB10-E, provides methodology and criteria for properly coordinating microwave radio systems in the merged Domestic Public Fixed Radio Services and Private Operational-Fixed Microwave Service bands. These interference criteria are based on levels of interference established in Parts 21 and 94 of the Federal Communications Commission (FCC) Rules and Regulations. TSB10-F will have particular significance in facilitating the transition of 2GHz fixed systems to higher bands in order to accommodate the new PCS systems.
**Product Code 3** Jun, 1994 **COMMITTEE:TR-14.11**
**$163.00**